

observational constraints on the role of galaxy mergers and interactions in galaxy assembly. The Rubin Observatory, which is optimised to deliver fast, wide field-of-view imaging, will enable deep and unbiased observations over the 18,000 square degrees of the Legacy Survey of Space and Time (LSST), resulting in samples of potentially of millions of objects undergoing tidal interactions.

Using realistic mock images produced with state-of-the-art cosmological simulations we perform a comprehensive theoretical investigation of the extended diffuse light around galaxies and galaxy groups down to low stellar mass densities. We consider the nature, frequency and visibility of tidal features and debris across a range of environments and stellar masses as well as their reliability as an indicator of galaxy accretion histories. We consider how observational biases such as projection effects, the point-spread-function and survey depth may effect the proper characterisation and measurement of tidal features, finding that LSST will be capable of recovering much of the flux found in the outskirts of L^* galaxies at redshifts beyond local volume. In our simulated sample, tidal features are ubiquitous in L^* galaxies and remain common even at significantly lower masses ($M^* > 10^{10} M_{\text{sun}}$). The fraction of stellar mass found in tidal features increases towards higher masses, rising to 5-10% for the most massive objects in our sample ($M^* \sim 10^{11.5} M_{\text{sun}}$). Such objects frequently exhibit many distinct tidal features often with complex morphologies, becoming increasingly numerous with increased depth. The interpretation and characterisation of such features can vary significantly with orientation and imaging depth. Our findings demonstrate the importance of accounting for the biases that arise from projection effects and surface-brightness limits and suggest that, even after the LSST is complete, much of the discovery space in low surface-brightness Universe will remain to be explored.

[구 GC-06] Probing neutral gas clouds and associated galaxies in the early universe

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Neutral (HI) gas clouds associated with galaxies are responsible for fuelling the star-formation in the universe. In literature, the extremely strong damped Lyman-alpha absorbers (or ESDLAs) have been known to be sensitive to the effects of HI-H2 transition and star-formation in galaxies. Yet, ESDLAs are rare to probe due to the smaller cross

section they subtend on the sky (similar to galaxies).

In my talk, I will focus primarily on my study of the nature of ESDLAs that are observed as absorption signature along the line-of-sight (LOS) of a quasar (QSO). I will further look at the HI-H2 transition and interesting results relevant to diffuse molecular gas and the multi-phase medium (gas in different ionization states) that are associated with ESDLAs.

Furthermore, I will also discuss how the ESDLA environments differ from the high star-forming and molecular environments detected in blind optical and radio surveys consecutively.

[구 GC-07] Tracing the first galaxies with the James Webb Space Telescope

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I will start with presenting new results on the stellar populations of galaxies at a redshift of $z=9-11$, when the universe was only a few hundred million years old. By combining Hubble Space Telescope observations with Spitzer imaging data, I will show how challenging it is currently to measure basic physical properties of these objects such as star-formation rates, stellar masses and stellar ages. In particular, the current measurements greatly depend on the assumptions (priors) for the spectral energy distribution modeling. Finally, I will discuss how the James Webb Space Telescope (JWST) will revolutionize this field next year and allow us to probe and characterize the first generation of galaxies in much greater detail. Specifically, I will present an overview of the JWST Advanced Deep Extragalactic Survey (JADES), a joint program of the JWST/NIRCam and NIRSpec Guaranteed Time Observations (GTO) teams involving 950 hours of observation.

[구 GC-08] Large Scale Distribution of Globular Clusters in the Coma Cluster

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Coma cluster (Abell 1656) is one of the most massive local galaxy clusters such as Virgo, Fornax, and Perseus, which holds a large collection of globular clusters. Globular cluster systems (GCSs) in a galaxy cluster tell us a history of hierarchical cluster assembly and intracluster GCs (ICGCs) are known to trace the gravitational potential of the galaxy cluster.

Previous studies of GCSs in Coma mainly utilized data obtained using Hubble Space Telescope (HST) with high spatial resolution. However, most of the data were based on narrow-field pointing observations. In this study we present the widest survey of GCSs in the Coma cluster using the archival Subaru/Hyper Suprime-Cam (HSC) g and r images, supplemented with the archival HST images.

The Coma GCSs are largely extended in E-W and SW direction, along the general direction of Coma-Abell 1367 filament. This global structure of the GCSs is consistent with the spatial distribution of the intracluster light (ICL).

ICGC spatial distribution is largely extended to almost $\sim 50\%$ of the virial radius. Most of these ICGCs are blue and metal-poor, which supports the scenario that ICGCs are mainly originated from dwarf galaxies and some proportion from brighter galaxies. Implications of the results will be discussed.

[구 GC-09] Galaxy identification with the 6D friends-of-friend algorithm for high resolution simulations of galaxy formation

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Galaxy/Halo finding based on the friends-of-friend (FoF) algorithm has been widely adopted for its simplicity and expandability to the phase-space. However, cosmological simulations have been progressively bigger in size and more accurate in resolutions, resulting in that galaxy/halo finding gets computationally expensive more and more. In fact, we confirm this issue through our exercise of applying the 6-dimensional (6D) FoF galaxy finder code, VELOCIRAPTOR (Elahi et al. 2019) on the NewHorizon simulation (Dubois et al. 2021), in which typical galaxies with about $1e11 M_{\text{sun}}$ (10^7 particles) are identified with very low speed (longer than a day). We have applied several improvements to the original VELOCIRAPTOR code that solve the low-performance problem of galaxy finding on a simulation with high resolutions. Our modifications find the exact same FoF group and can be readily applied to any tree-based FoF code, achieving a 2700 (12) times speedup in the 3D (6D) FoF search compared to the original execution. We applied the updated version of VELOCIRAPTOR on the entire NewHorizon simulation (834 snapshots) and identified its galaxies and halos. We present several quick comparisons of galaxy properties

with those with GALAXYMaker data.

[구 GC-10] Probing Intracluster Light of 10 Galaxy Clusters at $z > 1$ with Deep HST WFC3/IR Imaging Data

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Intracluster light (ICL) is diffuse light from stars that are bound to the cluster potential, not to individual member galaxies. Understanding the formation mechanism of ICL provides critical information on the assembly and evolution of the galaxy cluster. Although there exist several competing models, the dominant production mechanism is still in dispute. The ICL measurement between $z=1$ and 2 strongly constrains the formation scenario of the ICL because the epoch is when the first mature clusters begin to appear. However, the number of high-redshift ICL studies is small mainly because of observational challenges. In this study, based on deep HST WFC3/IR data, we measured ICL of 10 galaxy clusters at redshift beyond unity, which nearly doubles the sample size in this redshift regime. With careful handling of systematics including object masking, sky estimation, flatfielding, dwarf galaxy contamination, etc., we quantified the total amount of ICL, measured the color profile, and examined the transition between BCG and ICL.

[구 GC-11] A tale of two cities: Two galaxy clusters at cosmic noon

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At high redshift, unlike local, many galaxy clusters are still at their stages of building. Likewise, they show a wide range in their star formation properties: some are still forming stars actively unlike their local counterparts, while others have very low level of star formation already. Here we report the two high-redshift ($z \sim 1$) galaxy clusters, confirmed via Magellan MOS observation. While existing at similar redshift and having similar mass, these two clusters show very